burnt at a white heat are leather-coloured, and have a silver-gray appearance.

The second layer (No. 2) is divided into two varieties, *a* and *b*, the former of which is black from the presence of lignite, and yields lemon-yellow bricks; this colour is due to the conversion of the cerium oxide Ce_2O_3 into the lower oxide Ce_3O_4 by the action of the carbon which is present. The *b* variety is blackish-gray, and yields orange-red to orange-yellow bricks.

The third layer contains less cerium than the other two, and the bricks made from it are of a fainter orange colour.

The amount of glucina present is very characteristic of the Hainstadt clay. Ammonium chloride, which occurs only in traces in some portions of the clay, exists in quantity in others; and in one piece which crumbled to pieces a crystal of sal-ammonia was found measuring about 2 centimetres in length and 1·5 centimetres in thickness.

It will be seen from the above that the oxides of cerium which were hitherto of only theoretical interest, are now of technical importance. They have long served as colouring substances in building materials without the fact having been known, and from the large amount present in the Hainstadt clay there are prospects of their being brought into use as paints.

The variation in the colour of the bricks, already mentioned as being produced according to the degree of heat to which they are submitted in the process of burning, does not appear to be due to any action of the silicate on the ceric oxide, as the latter substance can itself be made to assume either colour by igniting it at a suitable temperature. The small amount of iron present in the clay is found to have no influence on the colour of the bricks, which however is affected by the admixture of larger quantities of iron. Dr. Strohecker mentions a number of streets in Frankfort in which houses constructed of the different sorts of cerium bricks are to be seen; the leather-coloured bricks occur in Palmstrasse, Bergerstrasse, Schleidenstrasse, Schillerplatz, Goetheplatz, &c.; the orange-red bricks at the police-station, the law-courts, and in the walls of the zoological garden, &c., and the lemon-yellow bricks at a villa near the west station at Hanau, and at a house in the Verlängerte Zeil at Frankfort. The houses of the peasants near Hainstadt are built of lightly-burnt bright flesh-coloured and yellow bricks.

The somewhat remarkable fact that chemists have so long failed to recognise anything other than ferric oxide as the cause of the colours in these bricks may probably be explained by the large number of shades of colour produced by iron in its various stages of oxidation, by the presence of manganese, and by the employment of mixed clays containing the oxides of both cerium and iron.

HARVARD COLLEGE MUSEUM REPORT

PROF. AGASSIZ' Report, dated October 1885, has just reached us, and, as usual, it presents several topics of interest. Since the first section of the Museum was inaugurated in November 1860, the establishment has passed through many changes, and from being, at its origin, a State institution, it has gradually assumed that of an independent department of the Harvard College. While it has thus lost the immediate support of the State, it has gained the good will and interest of the students of the College, the class upon whom it must in a very great measure depend not only for its maintenance, but for its being a source of intellectual and scientific good.

During the first decade of its existence the resources of the Museum were spent in forming collections which, in some branches of science, have made it a great scientific centre. During this period of ingathering the teaching powers of the place were interfered with. Now this period has so far passed that the resources of the place will be chiefly expended on its teaching, its original investigations, and its publications.

The foundation of this Museum dates from the publication of the "Origin of Species." The powerful movement effected by this work on the scientific thought of the age has not failed in modifying the problems which this institution was intended by its original founder to illustrate and to solve; and rightly does the son write that, if the synoptic, systematic, faunal, or palæontological collections should cease to bear the interpretation given to them by his father (the founder), their interest and importance for the advocates of the new biology would not be one whit lessened.

It is pleasant to note that the plans of Prof. Louis Agassiz—the founder of the Museum—have been, it is known, realised, and indeed beyond his most sanguine expectations, and that his son and successor now sees the establishment of a prosperous School of Natural History, amply provided with laboratories, connected with a University, and recognising in the administration of its trusts the claims of the College and of the advanced students, as well as those of the original investigator, and giving to both the latter ample opportunity of publishing their theses or researches. It has not even forgotten the specialists, for whom it has collected vast stores—stores in every way available, as most of the specialists in Europe will gladly testify.

Very truly writes Prof. A. Agassiz in reference to original investigation, that such is always best promoted in connection with educational institutions, and we would that the fact were more recognised in these countries; and in regard to museums belonging to such he suggests that they should grow so fast, and no faster, as the demand for such growth arises, otherwise they become mere unwieldy and meaningless accumulations. We may add that in countries where large museums are kept up by the State, *University or College Museums on an extensive* scale are a vast mistake. The college student's needs are very limited, and the money spent on adding to and keeping up collections would be infinitely better expended as aid to original research. All experienced teachers know how small is the stock of material required for their demonstrations, and how comparatively easy nowadays it is to procure such.

Prof. Agassiz hints that it would be desirable if, in connection with the Laboratory of the United States Fish Commission, the Universities of the United States should found a sea-side laboratory, which would render unnecessary, unless for special work, the various establishments already being established along the American coast. The hint should not be lost on our own Universities and Colleges, which should be urged to assist in the establishment of the British Biological Station. A long list of donations and purchases, an account of the work done, memoirs published or assisted by the loan of collections, conclude this very interesting Report.

TECHNICAL EDUCATION IN NEW SOUTH WALES

THE progress of technical education during the last few years in this country has been watched with great interest by some of our more important colonies which are desirous of not lagging too far behind the mother country in their arrangements for giving special instruction to artisans in subjects allied to the industries in which they are engaged. The Report of the Minister of Public Instruction of New South Wales *recently issued* contains some interesting particulars as to the establishment of a Technical College in Sydney and the organisation of trade classes in the colony. The present

Technical College of Sydney, like many similar institutions in this country, has grown up out of the Sydney School of Arts. From 1873 to 1877 plans for the extension of the school were carefully considered, and in 1878 the Colonial Parliament granted 2000*l.* towards the inauguration of a Technical College. In 1883 the Government decided to establish a State system of technical education in New South Wales, and having carefully examined the scheme of the City and Guilds of London Institute, and compared it with what was being done on the continent of Europe, they decided that the course of study and system of instruction to be adopted in their college should "accord with the practice of the City and Guilds of London Institute, with such modifications as seemed necessary to meet local requirements and appliances." "Following out the principle laid down by the City of London Guilds for their own guidance, the Board of Technical Education resolved that the object of technical instruction in the colony would be to improve the industrial knowledge of workmen by teaching the sciences and principles underlying their handicraft, and that such teaching should be illustrated by the best apparatus and machines that can be obtained, and by visits to workshops, manufactories, &c." No sounder views than these could be expressed. In 1884 the Parliamentary vote for technical education had increased to 17,093*l.* 3*s.* 4*d.*, and more than forty classes were in operation at the College. These figures indicate the great advance that has been made. As now organised, the College contains thirteen departments, viz., Agriculture, Applied Mechanics, Art, Architecture, Geology, Chemistry, Commercial Economy, Mathematics, Music, Elocution, Pharmacy, Physics, and Domestic Economy. Some of these subjects are outside the curriculum of our own Technical Colleges; but there is much to be said in favour of the introduction of some non-scientific subjects into a technical course; and where statesmanship is almost a profession the study of elocution in early youth is of distinct advantage. The average number of students in the College during the past session has been 917, and the fees paid by the students amounted to 1838*l.*

For the benefit of artisans engaged in the building-trades, classes have been established in decoration, plumbing, bricklaying, wood-carving, carpentry, and joinery; and in many of those classes the syllabus of instruction is identical with that in use at the Finsbury Technical College Recently, the Council of the City Guilds Institute have received an application to extend their technological examinations to the colony, and to award certificates and prizes on the results. This application is at present under the consideration of a Committee of the Institute. There can be no doubt that all efforts to bring the colonies and mother country into closer relationship should be encouraged, and the more the colonial system of education is assimilated to our own, the greater will be the sympathy between the colonists and the inhabitants of the United Kingdom. This sympathy is of greater advantage to our commercial interests than is generally supposed; for it tends to link together the colonies and the mother country into one vast empire, the several parts of which will depend upon one another rather than upon foreign markets for the supply of their various wants.

It is to be hoped that the example of New South Wales will be followed by Victoria, and may extend to New Zealand and to other parts of our colonial empire. The advancement of technical education in our colonies is to us a matter only second in importance to the improvement of the means of technical instruction in our own manufacturing towns; and it must be a source of satisfaction to the City and Guilds of London Institute that the influence of its operations is being felt, not only in the centres of our home industries, but already in one of the most flourishing of our colonies.

SEEBOHM'S HISTORY OF BRITISH BIRDS[1]

SINCE our last notice of Mr. Seebohm's book (NATURE, vol. xxviii. p. 126) the author has brought it to a successful conclusion, and has fully sustained his reputation as an original and painstaking writer. The great defect in our standard works on British birds has been a want of originality, as one author after another, and one editor after another, have compiled books on the subject, each one founded on the labours of their predecessors, so that the best books have been but compilations. Mr. Seebohm has started on quite a different principle, and the greatest charm of his book consists in the account of the life and habits of the birds, drawn from his own actual experience of the species in their native haunts. And before giving to the world his varied experiences, he has, as is well known, travelled extensively in Europe and Northern Asia, and has become celebrated as the discoverer of the breeding-places of many species of European birds, previously unknown. In this respect he resembles the late John Wolley, for whom a fellow-feeling of sympathy is expressed by Mr. Seebohm throughout his work, but, more fortunate than that well-known naturalist, our author has survived to record in his own books the results of his successful expeditions. It must not, however, be supposed that Mr. Seebohm, in giving us detailed accounts of the life of the birds, has neglected in any way the scientific portion of his task. On the contrary, he has grappled with this difficult subject in a manner which is highly creditable, and however divided opinions may be as to the advisability of some of the changes of nomenclature which he introduces, there can be no question as to the greater simplicity which he has once more attached to the names of the British birds, and we believe that he will be largely followed. Some revision of the code of rules proposed by the British Association appears to us to be necessary, and we trust that ere long Mr. Seebohm or some other ornithologist will draw out a scheme for their modification, in order to bring them into harmony with the more advanced state of science of the present day; and an attempt to arrive at a definite understanding with our Continental and American brethren as to the employment of a uniform system of nomenclature ought soon to be made. The opportunity may probably come when the authoritative "List of North American Birds" is promulgated by the American Ornithologists' Union, a work which is anxiously awaited by naturalists in this country, and it will then be competent for us to consider the merits and demerits of the trinomial system of nomenclature which is gaining ground considerably on this side of the water, but which cannot be adopted without the utmost consideration. Mr. Seebohm does not hesitate to adopt it, but how far he will be followed remains to be seen.

We can cordially recommend this book to all lovers of ornithology, both at home and abroad, and to young and old alike, for they will find ample material for study, and a very great deal that is new. It is by far the best introduction to a knowledge of British birds that we are acquainted with, and a great deal of the subject-matter is very original. The criticisms of contemporary ornithologists are occasionally somewhat hard, but no one can complain of a want of candour on the author's part, and as he no doubt expects equally hard hitting in return, he must have counted the cost before striking at the authors who so often arouse his ire. One thing we do not clearly understand, and that is the constant odium thrown by Mr. Seebohm upon the "Ibis List of British Birds" compiled by a Committee of the B.O.U., of which the author was himself a member. A long time was spent by this Committee in investigating the subject, and as its conclusions were carried by a majority of votes, all the members

[1] "A History of British Birds; with Coloured Illustrations of their Eggs." By Henry Seebohm. Vols. I. to VI. (London: R. H. Porter, 1883 to 1885.)